

STATE COUNCIL OF TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA
TEACHING AND EVALUATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES

DISCIPLINE: TEXTILE ENGINEERING						SEMESTER: 4TH							
SL NO	SUBJECT CODE	SUBJECT	PERIODS			EVALUATION SCHEME							
			L	T	P	INTERNAL EXAM			END SEM EXAM	TERM WORK	PRACTICAL EXAM	TOTAL MARKS	
						TA	CT	Total					
THEORY													
1.	ETT 421	TEXTRONICS	4	-	-	10	20	30	70			100	
2.	TXT 401	TEXTILE FABRIC DESIGN-I	4	-	-	10	20	30	70			100	
3.	TXT 402	YARN MANUFACTURE- II	4	-	-	10	20	30	70			100	
4.	TXT 403	FABRIC MANUFACTURE-II	4	-	-	10	20	30	70			100	
5.	TXT 404	TEXTILE CHEMICAL PROCESSING-II	4	-	-	10	20	30	70			100	
PRACTICAL/TERM WORK													
6.	ETP 421	TEXTRONICS			4					25	25	50	
7.	TXP 401	YARN MANUFACTURE - II			4					25	25	50	
8.	TXP 402	FABRIC MANUFACTURE-II			4					25	25	50	
9.	TXP 403	TEXTILE CHEMICAL PROCESSING-II			4					25	25	50	
10.	TXP 404	TECHNICAL SEMINAR			3					25	25	50	
GRAND TOTAL			20		19	50	100	150	350	125	125	750	

Total Contact hours per week: 39

Abbreviations: L-Lecture, T-Tutorial, P-Practical, TA- Teacher's Assessment, CT- Class test

Minimum Pass Mark in each Theory Subject is 35% and in Practical subject is 50%

TEXTRONICS

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	ETT 421	Semester	4 th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

Objective : The state of art of Textile machines require a precision control over their speed, change in speed temperature, to & fro motions levels. So most of the textile machineries equipped with electronic sensors & limit switches. A little malfunctioning of these electronic sensors may lead to deliver a futile situation and result in worthless products. Hence it has become essential to acquire basic knowledge about all these electronic control system. This paper will enlighten the students of 4th semester diploma about the principles, working & uses of electronic sensors & devices. On completion of this course, students will be able to develop understanding and uses of

1. Special semiconductor devices
2. Opto-electronic devices.
3. Regulated power supply
4. Principles of digital electronics
5. Sensors and transducers
6. Microprocessor
7. PLC
8. Automatic Control

Sl. No	Topics	Topic wise distribution of periods
01	Module-I Special Semiconductor Devices	04
02	Module-II Opto-Electronic Devices	04
03	Module-III Regulated Power supply	04
04	Module-IV Principles of Digital Electronics	08
05	Module-V Sensors and Transducers	15
06	Module-VI Microprocessor	12
07	Module-VII PLC	07
08	Module-VIII Automatic Control	06
TOTAL		60

Module-I (Special Semiconductor Devices)

JFET, MOSFET , SCR , TRIAC, DIAC

Module-II (Opto-Electronic Devices)

Explain the operation and uses of - LED , LCD, Opto-Coupler, LASER

Module-III (Regulated Power supply)

Explain the function of ordinary DC power supplier , Classify different units of DC series voltage regulators , Sampling units, Reference unit, Comparator unit, Amplifier unit, Control unit , Explain briefly the function of a simple D.C. series & shunt regulator.

Module-IV (Principles of Digital Electronics)

Explain types of Flip-Flop and its use, Describe briefly about memory element, Explain the function of shift registers, Describe the function and use of Mod-10 and ring counter.

Module-V (Sensors and Transducers)

Describe sensors for sensing pressure, temperature, moisture humidity, flow, level, Explain Temperature measurement using Resistance Thermometer, Thermocouple, Thermister, Explain pressure measurement using manometer, U-tube, Elastic type pressure gauge (Bourdon tube diaphragm, bellows etc.) , Classification of flow-meter, Variable-head flow –meter, principle of

operation, advantages and disadvantages of orifice plate, venture tube nozzles, Describe the function of limit switch proximity switch and its use.

Module-VI (Micro processor)

Describe introduction to Intel 8085, Explain register organization of 8085, State instruction sets of 8085, Describe assembly languages concepts, Describe preparation small programmes using 8085. Explain the use of - Data bus, Address bus, Control bus, Interrupt time, Multi-tasking buses

Module-VII (PLC)

Explain basic structure and operation of PLC, Describe simple ladder logic, Write simple ladder programme (implementing only OR, AND, NOR, NAND, Ex-OR, Ex-NOR logic, Timer Operation.

Module-VIII (Automatic Control)

Explain the operation of Automatic control of-- liquid level of a vessel, pressure of a vessel, Temperature control of an oven, Discuss the process diagram of an ON-OFF action of an Oven.

Learning Resources:

1. Integrated Electronics, Analog and Digital systems by J. Millman & Christos C. Halkias.
2. Electronics Devices and Circuits by Motor Shed.
3. Electronics Devices and Circuits by G.K. Mithal.
4. Power Electronics by Rashid.
5. Digital Circuits & Systems by Douglas N Hall Mc Graw Hill Publications.
6. Digital Electronics by Gaur.
7. Digital Systems Design by Mano.
8. Microprocessor by Gaonkar.
9. Microprocessor by B. Ram.
10. Industrial Electronics by Paul B. Zaber.
11. Mechanical Measurement & Measuring Circuits by S. Khedkar.
12. Instrumentation by Nakara Choudhary.
13. Industrial Electronics by S. N. Biswas.
14. Mechanical and Industrial Measurement by R.K. Jan.
15. Electrical and Electronics Instrumentation by A.K. Sawhney.
16. Industrial Electronics by G.K. Muhal.
17. Thvnstons by P.C. Sen.

TEXTILE FABRIC DESIGN-I

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXT 401	Semester	4 th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

Objective : The student of 4th semester Textile Technology should be capable enough to distinguish between different varieties of fabrics . Fabric differs due to change in their construction parameters , construction process as well as composition . Several designs also play a major role in ornamentation of the fabric. So this paper will enable them to investigate different fabric structures and factors affecting them in detail. On completion of this course, students will be able to develop understanding of :

- (a) Different types of weaves.
- (b) Their construction.
- (c) Their drafting, lifting & pegging planing. Etc

Sl. No	Topics	Topic wise distribution of periods
01	Module-I Basic Weaves	10
02	Module-II Plain Weaves and its derivatives	10
03	Module-III Twill Weaves and its derivatives	15
04	Module-IV Simple towelling & Curtain Fabrics	10
05	Module-V Compound structures	15
TOTAL		60

Module-I (Basic Weaves)

Differentiate woven, non-woven, knitted structures ; Explain representation of weaves and use of point paper ; Describe drafting , lifting, denting plan of a design on point paper.

Module-II (Plain Weaves and its derivatives)

Basic concept of Plain woven structure, Construct standard plain weaves and its derivatives like Warp rib, weft rib and matt etc.; Ornamentation of plain weave; Explain the application of these weaves in different field of Textile.

Module-III (Twill Weaves and its derivatives)

Basic concept of twill weaves; Explain influence of twist direction and angle of twill on appearance of fabric ; Construct Derivatives of Twill design – Balanced and Un balanced twill, pointed twill ,combined twill (end and end ,pick and pick Combination.), broken twill, Construct Diamond & Corkscrew; Construct satin & Sateen.; Explain the application of these weaves in different field of Textile.

Module-IV (Simple towelling & Curtain Fabrics)

Construct ordinary honey comb ,brighton, Huck-a-Back, Mock leno with draft and peg plan; Explain the application of these weaves in different field of Textile.

Module-V (Compound structures)

Construct Bedford cords(Plain & twill faced with wadding effect) & welts design; Construct Extra warp and extra weft designs with drafting & lifting;Explain the application of these weaves in different fabrics.

Learning Resources:

1. Textile Design and Colour
2. Advance Textile Design
3. Woven Cloth Design

Watson.

Watson.

Mir Publisher.

YARN MANUFACTURE- II

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXT 402	Semester	4 th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

Objective : The second being of its series this paper enables the students to investigate the preparation process of the most important intermediate stage i.e. yarn. Before being converted into a yarn the fibers require some sort of parallelization & refinement. This paper deals up to the final stage of the process of yarn preparation. On completion of this course, students will be able to develop knowledge and skills of

- (1) Drawing ,Comber ,Speed Frame.
- (2) Their working principles
- (3) Functions of various parts
- (4) Passage of material
- (5) Maintenance & Settings

Sl. No	Topics	Topic wise distribution of periods
01	Module-I Draw Frame	05
02	Module-II Comber	10
03	Module-III Speed frame	15
04	Module-IV Production calculation	10
TOTAL		60

Module-I (Draw Frame)

Explain the objects of Drawing, Discuss principles of doubling and drafting , Explain the passage of material and function of different parts, Study various modern drafting system, Roller settings, Drafting wave, Roller slip, Top roller weighting, Electronic stop motion, Discuss the technological design change in modern draw frame, Explain drafting roller arrangement ,auto levelling, suction arrangement and auto doffing.

Module-II (Comber)

Objects and importance of combing, Explain the need for comber lap preparation, Discuss the effect of fibre presentation, Discuss the effect of pre-comb draft, Discuss silver doubling and ribbon lap M/C, ,unilap M/C, Degree of combing, Combing cycle ,types of feed, Discuss Cylinder clothing ,clamping line distance ,increase in nips/min, concentric nipper movement, Explain the performance affecting quality of combed cycle, Discuss salient features of modern comber,

Module-III (Speed Frame)

Explain the objects of speed frame, Discuss passage of material through S/F and function of important parts, Explain modern drafting system, Discuss principles of twisting , winding & package formation., Explain Differential motion used in modern speed frame., Discuss modern developments in speed frame; drafting –builder ,twisting-driving system ,other features-creel ,package size ,roving tension control, flyer, suction etc. , Roving Defects and their remedies.

Module-IV (Production calculation)

Calculate Speed, Draft, production of Draw frame, comber & Speed frame.

Learning Resources :

1. Manual of Cotton Spinning (Vol-III & IV) . -The Textile Institute, Manchester,1965
& 1968.
2. Cotton Spinning E.R.Merill
3. Cotton Spinning TAI Publication
4. Cotton Spinning W.S.Taggart.
5. Process Control in Spinning ATIRA Publication.

FABRIC MANUFACTURE-II

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXT 403	Semester	4 th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

Objective : The students of 4th Semester should be well acquainted with the different preparation process of state of the art fabric required for international quality market. This paper enables them to develop concepts in non conventional weaving. Also this paper partly prepares the technicians to upgrade their knowledge to cope –up with fast changing textile industries of India and abroad. On completion of this course ,students will be able to develop understanding of ;

- (a) Auxiliary motions in looms.
- (b) Working of the Dobby & Jacquards
- (c) Automation of looms

Sl. No	Topics	Topic wise distribution of periods
01	Module-I Secondary and Auxiliary motion	14
02	Module-II Multiple Box Motion	06
03	Module-III Dobby & Jacquard shedding	20
04	Module-IV Modern developments in auto loom	10
05	Module-V Shuttle –less Looms	10
TOTAL		60

Module-I (Secondary and Auxiliary motion)

Explain take up, Classify take up motion, Discuss Negative and positive take up motions, Explain let off, Classify let off motion, Discuss Negative and positive let off mechanism, Explain Warp protecting motion ,Discuss weft stop motion, Discuss Break Mechanism, Discuss Timings and settings of these motions.

Module-II (Multiple Box Motion)

Explain drop Box mechanism, Explain pick & pick looms, Brief idea on card saving devices .

Module-III (Dobby & Jacquard shedding)

Explain working principles of dobbies like Keighly , cam, paper and electronically controlled doobby, Discuss pegging for doobby (Right & left hand) Loom.

Explain principles of Jacquard weaving, Classify Jacquards, Explain working principle of single lift single cylinder Jacquards & double lift double cylinder Jacquards., Discuss Jacquard building and harness ties. Casting out of a Jacquard, Brief idea on Electronic Jacquard.

Module-IV (Modern developments in auto loom)

Explain weft feeler mechanism., Discuss 3 try weft fork mechanism, Discuss Automatic warp stop motion, Explain Shuttle protector, Discuss Automatic cop changing motion, Discuss fabric defects, its causes and remedies.

Module-V (Shuttle –less Looms)

Classify & Explain unconventional looms, Discuss Limitation of shuttle looms, State the advantages of shuttle-less looms over shuttle looms, Explain the preparation of raw materials for unconventional looms. Classify & explain briefly on different types of weft insertion processes in shuttle-less looms like-Rapier, Gripper, Fluid jet etc.

Learning Resources:

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|---|--|
| 1. Weaving Mechanism (Vol-1 & 2) | N.N.Banerjee |
| 2. Weaving Mechanism | Fox |
| 3. Principles of Weaving | Robinson & Marks |
| 4. Cotton Weaving | MIR Publication ,Muscow. |
| 5. Weaving Calculation | R.Sengupta. |
| 6. An Introduction to Automatic Weaving | Bennet. |
| 7. Cotton Yarn Weaving | Textile Association of India,Ahmedabad |
| 8. Loom Shed | BTRA Monograph |
| 9. Weaving Conversion of Yarn to Fabric | P.R.Lord & M.H.Mohamed. |

TEXTILE CHEMICAL PROCESSING-II

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXT 404	Semester	4 th
Total Period:	60	Examination	3 hrs
Theory periods:	4P / week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

Objective : Being the 2nd part of its series this paper enlightens the students about colouring of new age textiles as well as detailed know of functional performances. This paper also deals with localized colorization, otherwise known as printing . Students will be able to develop an idea about different machines used industrially for printing and finishing of commercial fabrics.

On completion of this course , students will be able to develop knowledge and skills in different processes in dyeing ,printing and finishing.

Sl. No	Topics	Topic wise distribution of periods
01	Module-I Dyeing of Man made & their Blends	10
02	Module-II Printing	25
03	Module-III Mechanical finishing	10
04	Module-IV Chemical Finishing	10
05	Module-V Washing & drying	05
TOTAL		60

Module-I (Dyeing of Man made & their Blends)

Discuss Dyes used for man-made fibres, State Dyeing of polyester with disperse dyes by carrier ,HT&HP and Thermosol method, State Dyeing of Cationic dye-able polyester fibre, State the Dyeing of Polyester /Cotton and polyester /Wool blended fabrics with suitable dyes, State the Dyeing of Nylon with acid ,State the Dyeing of Acrylic with basic dyes, State the Dyeing of acetate with disperse dyes., Discuss faults caused in dyeing and their remedies.

Module-II (Printing)

State the objects of printing, Differentiate between dyeing and printing, Preparation of printing paste, State the sequence of printing, Thickeners used in printing, Classify and state the functions and properties of thickeners, Discuss after treatments given to printed fabrics, Discuss Auxiliaries used in printing.

Methods & Styles of printing , Differentiate between Dyes and printing, Discuss styles of printing – Direct ,Discharge &Resist, Discuss different methods of printing –Block printing ,Screen Printing ,Rotary screen Printing, Roller printing ,Transfer printing etc . Brief idea about preparation of screens for screen printing.

Printing of natural & viscose rayon fabrics with suitable dyes like vat dyes, reactive etc. State printing of wool ,silk & Nylon fabrics with acid dye, State printing of Polyester fabric with disperse dyes.

Module-III (Mechanical finishing)

State the objects of finishing, Classify finishes, Discuss importance of mechanical finishes., State the objects of calendaring and working principles of different calendaring M/C ,State the objects of stentering and working of different stenters. Discuss principles of sanforizing, Objects and methods of heat setting.

Module-IV (Chemical Finishing)

State the objects of chemical finishing, Classify of chemical finishes, Discuss methods of application of soft finishes ,stiff finishes ,resin finish, water proof and water repellent finish ,flame retardant finish ,fire proof finish, anti pilling finish ,carbonization ,Moth proof finish , Optical whitening ,anti mildew finishing.

State the objects of Mercerisation , Physical, Chemical & Structural Changes occurred after mercerization. Factors affecting mercerisation., Discuss working method of chainless mercerisation of cotton fabric.

Module-V (Washing & Drying)

State the importance of Washing machines, Classify washing machines. Discuss working principle of open –soaper machine.

State the objects of drying, Classify drying machines, Discuss Working principle of Hydroextractor , multi cylinder drying, IR/ RF dryer.

Learning Resources:

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|---|---------------|
| 1. Dyeing and Chemical Technology of Textile Fibres | E.R.Trotman. |
| 2. Technology of Dyeing | V. A. Shenai. |
| 3. Chemical Technology of Fibrous Material | Sadov. |
| 4. Principles of cotton printing | . G. Kale. |
| 5. Textile Printing | Miles. |
| 6. An Introduction to Textile Printing Technology of printing | M. Clerk. |
| 7. Technology of printing | R. S. Prayag. |
| 8. An introduction to textile finishing | J. T. Marsh |
| 9. Technology of Textile Finishing | V. A. Shenai |

TEXTRONICS (LAB.)

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	ETP 421	Semester	3 rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P/W	Term Work	25
Maximum marks:	50	End Semester Examination:	25

1. Study of different types of thermometer.
2. Study of different types of pressure Gauge.
3. Study of Orifice plate , Ventura meter ,nozzles.
4. Implementation of AND , OR , NAND , NOR , XOR, NOT gates and verification of truth table.
5. Verification of R- S flip – flop and J-K flip – flops
6. Verification of performance of Mod-10 Counter.
7. 4- bit up / down counters.
8. Study of 8085- based Microprocessor kit.
9. Simple programs using 8085 microprocessor kit.
10. Verify the performance of electronic on –off temperature controller.
11. Verify the operation of Automatic control of liquid level of a vessel.
12. Verify the operation of Automatic control of pressure level of a vessel.
13. Verify the operation of Automatic control of Temperature of a oven.

YARN MANUFACTURE – II (LAB.)

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXP 401	Semester	3 rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P/W	Term Work	25
Maximum marks:	50	End Semester Examination:	25

1. Study of the different parts of the Draw Frame and the flow of material in the machine.
2. Study of the Gearing Diagram of a model Draw Frame and to calculate the draft constants as well as individual drafts.
3. Learning of roller setting and changing of draft change pinion in the draw frame.
4. Study of the parts and Flow of the material in a silver Lapper Machine.
5. Study of the parts and flow of the material in a Ribbon Lapper Machine.
6. Study of the parts and flow of the material in the comber Machine.
7. Study of different parts and flow of material in a simplex machine.
8. Study the Gearing Diagram of simplex and calculation of Draft Constant.
9. Calculation of Spindle Speed and Twist Constant of a speed Frame.
10. Learning of Changing C.P. , T.W. & L.W ., etc. in the speed frame.
11. Study of building mechanism in speed frame.
12. Study of roller setting in speed frame.

FABRIC MANUFACTURE – II (LAB.)

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXP 402	Semester	3 rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P/W	Term Work	25
Maximum marks:	50	End Semester Examination:	25

1. Study of take-up motion and its defects ,calculation of pick/inch and dividend in a loom.
2. Study of negative let off motion in a loom and its defects.
3. Study of drop box motion in a loom ,card saving device and safety device.
4. To prepare the pattern and lacing the metallic cards and mounting in a Drop Box Loom.
5. Study of Warp Stop Motion (both mechanical and electrical).
6. Study of pirn changing Mechanism in an Auto Loom.
7. Setting of shuttle Box ,Box Swell ,Shuttle Feeler and Weft Feeler in an Auto Loom.
8. Study of climax Dobby, Mounting and motion to different parts.
9. Study of pegging the lattice in a doobby ,settings and defects.
10. Study of double lift & double cylinder Jacquard loom.
11. Study of card cutting device and preparation of cards as per design for jacquard.

TEXTILE CHEMICAL PROCESSING-II (LAB.)

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXP 403	Semester	3 rd
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P/W	Term Work	25
Maximum marks:	50	End Semester Examination:	25

1. Dyeing of nylon with acid dyes.
2. Dyeing of polyester with disperse dyes.
3. Analysis & Identification of dye.
4. Direct printing with pigment colour.
5. Direct printing of cotton with receptive & vat dyes.
6. Printing of Nylon fabric.
7. Printing polyester with disperse dyes.
8. Softening & Stiffening.
9. Finishing processes.
10. Mercerization of cotton.

TECHNICAL SEMINAR

Name of the Course: Diploma in TEXTILE ENGINEERING			
Course code:	TXP 404	Semester	3 rd
Total Period:	45	Examination	4 hrs
Lab. periods:	3 P/W	Term Work	25
Maximum marks:	50	End Semester Examination:	25

- 1 Class should be divided into smaller of not more than four in each Group . One group should be assigned a topic for the seminar. The topic should be usually elated to their course of students. Each students of the group should prepare on a particular aspect of the main topic with active support and guidance from a teacher guide. The students should be encouraged to extensively use the library facilities and also collect relevant material from different technical magazines and journals. Each student should be usually asked to present his paper on the topic of the seminar within 15minutes after which a question answer session may follow for 5 minutes
- 2 Students should be encouraged to display newspaper clipping and managing emerging technology on the date of the seminar.
- 3 The Termed work record should be maintained and evaluated by a faculty members and the final marks should be awarded.
4. In the end examination, External Examiner from outside and Internal Examiner will evaluate students.